

## MAMMOMAT 300,1000/3000

**SP**

Service

### Replacements of Parts

Bucky GRID\_OUT Switch S1  
in object tables with reciprocating grid  
on MAMMOMAT systems

MAMMOMAT 300,1000/3000

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English

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## Document revision level

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## General

This instruction describes how to replace the "Bucky GRID\_OUT Switch S1" in the object tables with reciprocating grids used with the systems MAMMOMAT 300 and MAMMOMAT 1000/3000.

With the help of switch S1 the information is produced which indicates to the processor that the grid is in motion. The switching characteristics of the built-in switch may change, the switch may get flawed. Its geometrical position in respect to the cam disc may get altered, thereby the produced signal may become erratic, useless. Such and similar failures of the S1 may result in problems with "Exposure request signal - AR". In such cases the error message ERR801 (AR time out) from the Mammomat stand will usually appear because the AR signal could not be received in the correct response time after the generator sent out the VH signal indicating its readiness to perform an exposure.

Whenever encountering the ERR801 first replace the built-in GRID\_OUT Switch S1. As replacement order the Repair Kit "Bucky GRID\_OUT Switch S1", Mat No: 086 20 572, from the Spare Parts Catalogue through Material Logistics of the Customer Services. Install this kit according to this instruction.

If the problem of ERR801 should persist after such an exchange, perform further troubleshooting as described in the technical documentation.

## Components concerned

Components concerned are mammography object tables with reciprocating grid used mainly in Mammomat 1000/3000/3000Nova systems, but also in MAMMOMAT 300. Material Numbers in use at the time this instruction was published:

064 31 600 / 064 31 816  
064 31 618 / 064 31 824  
066 07 969  
066 07 985  
066 07 605  
066 16 481  
066 07 977  
066 07 530

063 69 551 / 064 31 550  
063 69 594 / 064 31 568

If you encounter tables with Material numbers not listed here, evaluate the possibility of a logical application of this instruction, if necessary consult with CS HSC24.

### Remark

**As a general rule the carbon fiber top of the object tables doesn't need to be removed when making this replacement. In order to provide for necessary support of the moving grid if the carbon fiber top is removed, the "Grid holder" Mat No. 063 48 440 may be needed.**

**This is defined as a service tool within the Spare Parts Catalogue (Position 236 A in MAMMOMAT 1000/3000, or Position 240A in MAMMOMAT 300, respectively).**

## Tools required

Standard toolkit; including ring spanner 5.5  
Sliding calliper;

Oscilloscope;  
possibly the Grid holder, Mat No. 063 48 440 - see remark above.

## Documents required

The technical documentation delivered with the Mammomat system; for disassembly or assembly of covers refer to Installation and/or Service Instructions.

**NOTICE**

When during work described here, either disassembly or assembly, removal of covers or work under voltage is involved, all safety precautions - as mentioned in pertaining technical documents - have to be strictly observed.

## Parts included

Repair kit "Bucky GRID-OUT Switch S1", Material Number 086 20 572 contains:

Item	Description	Amount	Remark
1	Switch fastening plate with 3 press nuts	1	
2	Switch S1, SAIA Burgess	1	V4NS T7 AR1-GP-UL/ IP67
3	Screw, M2 x 12	2	
4	Screw, M2 x 6	1	
5	Insulation plate	1	ca. 13 x 20 x 1 mm
6	This repair instruction	1	

## Time required

Approximately 1.5 hours for 1 person.

### Preparatory works

#### Access to the Bucky GRID\_OUT Switch S1

In order to get access to the Bucky GRID\_OUT Switch S1:

- Loosen the recessed (Phillips) head countersunk screws and remove the covering plate at the remote end of the table top.
- Loosen the screws and remove the carrier plate with the sliding markers.

For illustration see the Figure 1.



Fig. 1

In order to get access to the Board D802 on the right side of the stand:

### Removing the stand covers

The MAMMOMAT 3000 stand covers exist in two versions:

- one with separate rear side covers
- one with a single rear cover that also covers the rear sides

#### MAMMOMAT stand with separate rear side covers

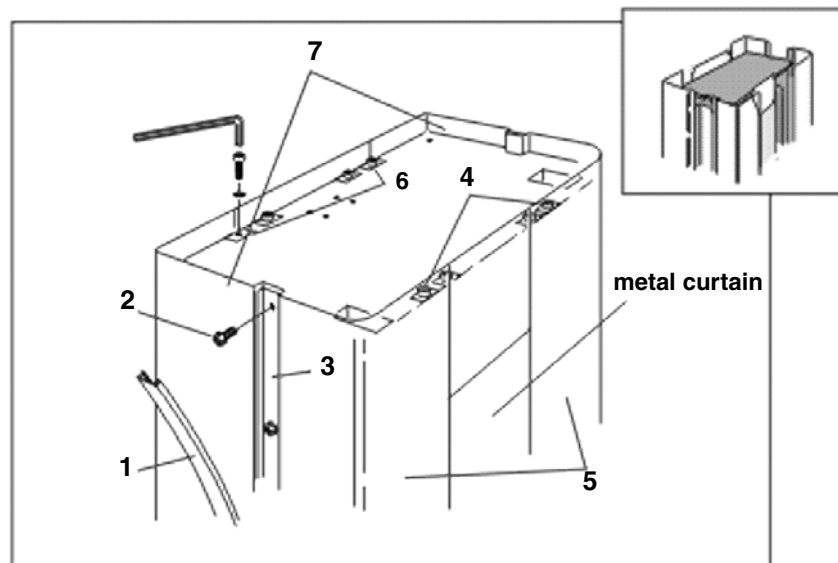


Fig. 2



**The metal curtain (see Fig. 2) is very sharp. After removing the stand front covers (5), mount protective strips onto the edges of the metal curtain. The strips are located inside the stand.**

- Remove the cap of the stand.
- Pry loose the plastic straps - No. 1.
- Loosen the screws and remove the stand covers, mainly on the right, in order to secure access to the PCB D802.



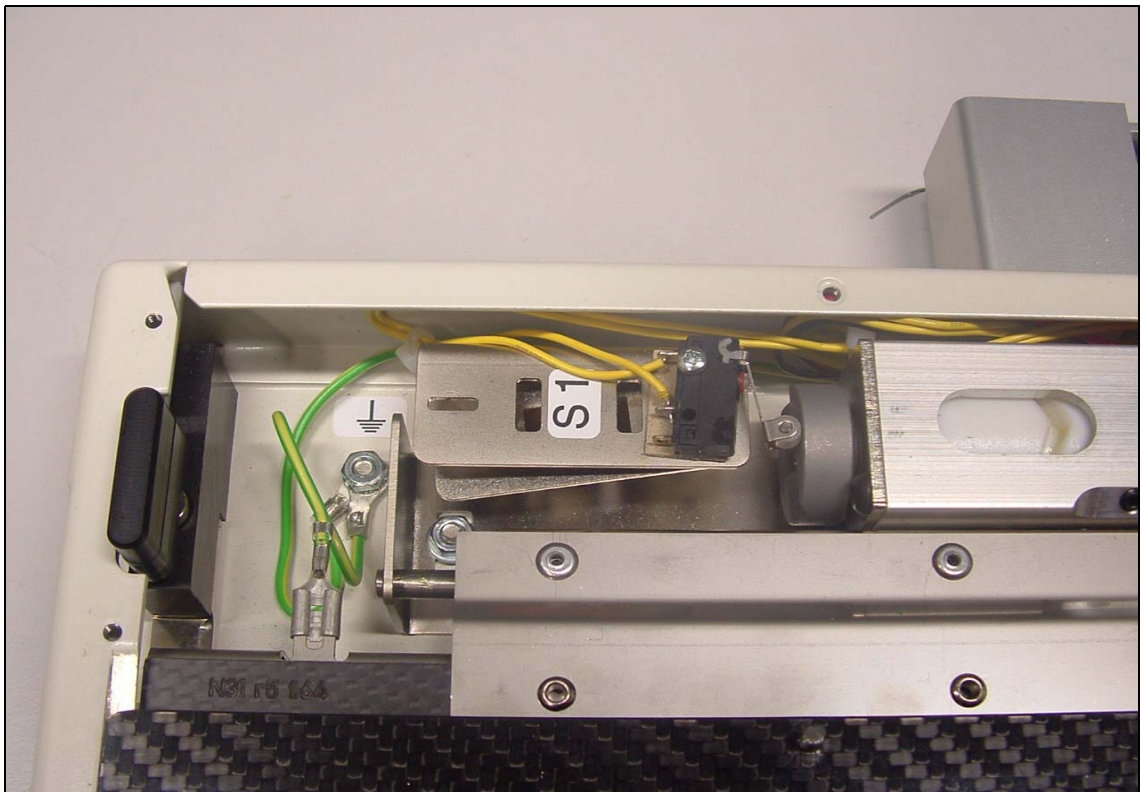


Fig. 3

## Work Steps

- Mark and unsolder the two leads connected to the Switch S1, loosen and unscrew three fixing screws and remove the switch and the fastening plate.
- Assemble the supplied switch, insulation plate and the fastening plate according to Figure 3. The fastening plate is below the holding bracket with press nuts pointing down, the insulation plate and the switch itself are on the top of the holding bracket.

### NOTICE

**When mounting the Bucky GRID\_OUT switch S1 to its place make sure that both states - ON and OFF of the switch are adjusted according to the specification of its manufacturer SAIA Burgess. The specified distances / measurements relate to the midpoint of the fixation bore and to the most distant point of the castor.**

- In order to prepare for mechanical adjustment tighten all the three fixing bolts first only lightly. Proceed according to Figure 4.
- By turning a screwdriver in the adjustment slit (above the label S1) the desired and suitable position can be reached. Measure with sliding calliper.
- Tighten the fixing screws if the position is correct. Crosscheck the position by repeated measurement after the screws are tightened; the exerted force may have caused misplacement.
- Re-attach and solder the leads on to the lugs of the switch, recal the first work step.

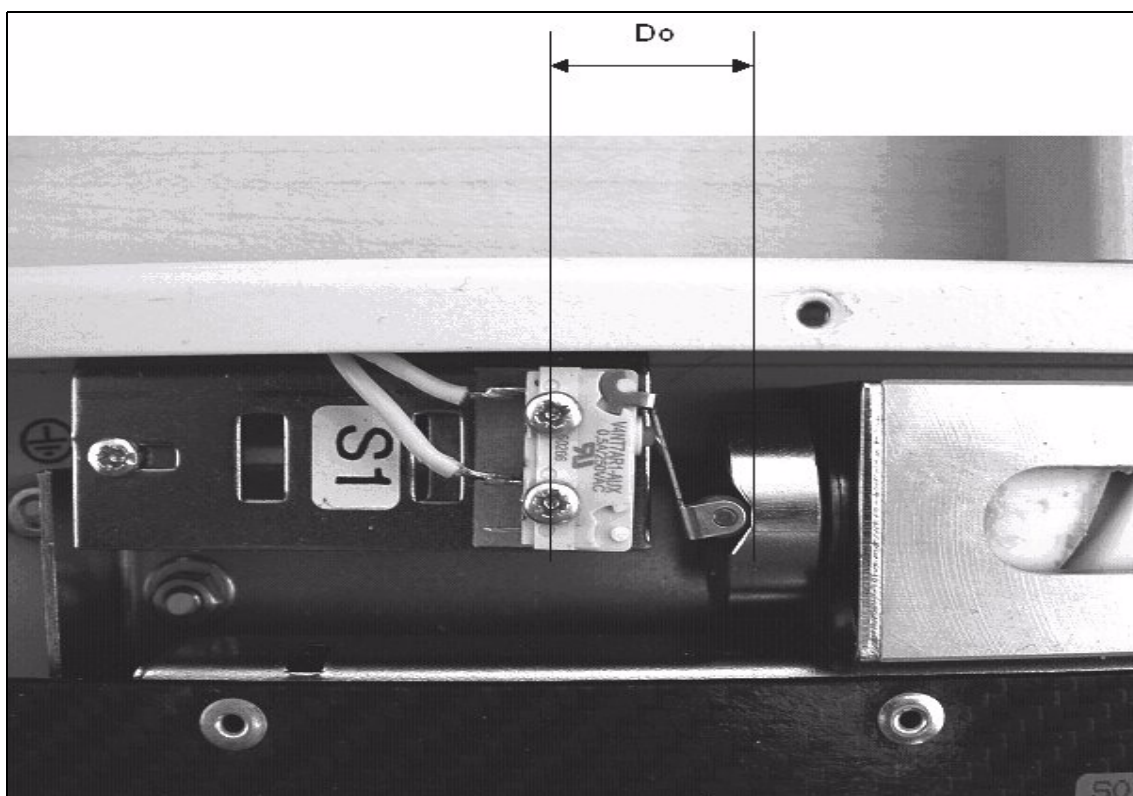


Fig. 4

Switch in the **OFF** state: (**Do** = distance when open)  
the specified measurement **Do** equals:  $18.1 \text{ mm} \pm 1.2 \text{ mm}$ ,  
i.e.:  $16.9 \text{ mm} \leq \text{Do} \leq 19.3 \text{ mm}$

- Having adjusted the OFF state correctly crosscheck for correct positioning in the ON state, for this turn the cam wheel of the grid drive motor by hand. Proceed according to Figure 5.

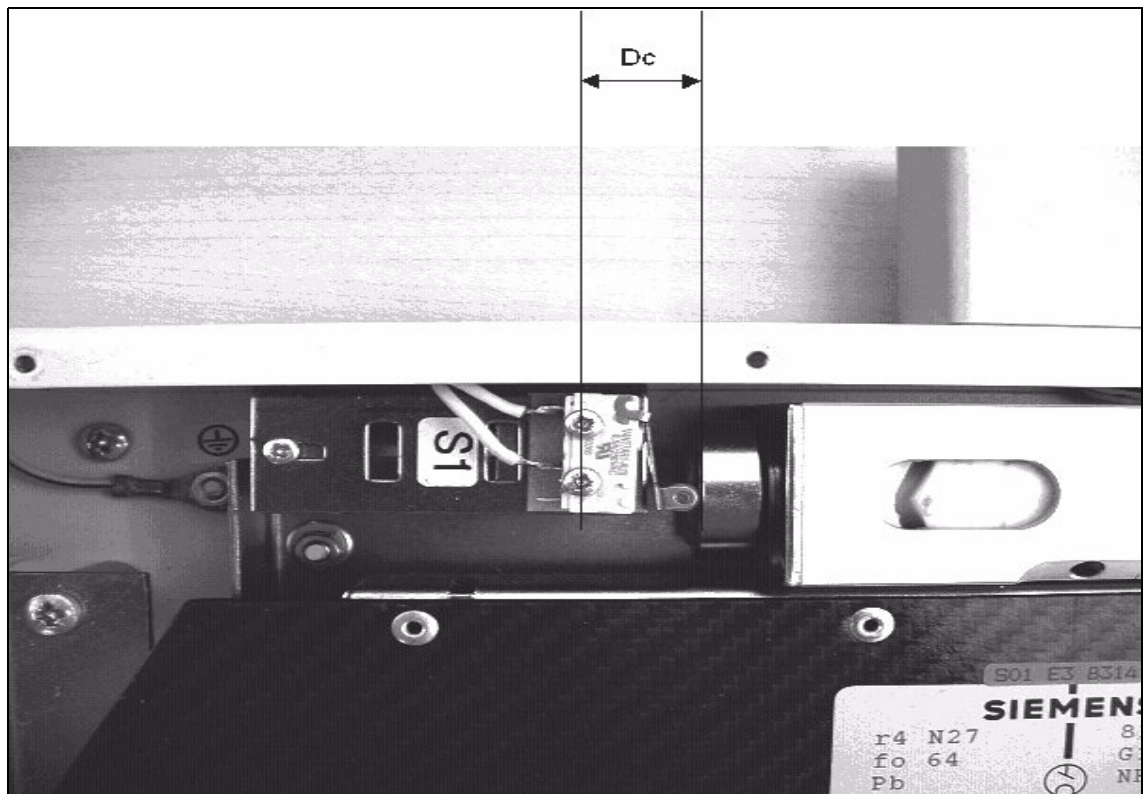


Fig. 5

Switch in the **ON** state: (**Dc** = distance when closed)  
 the specified measurement **Dc** equals:  $15.9 \text{ mm} \pm 1.2 \text{ mm}$ ,  
 i.e.:  $14.7 \text{ mm} \leq \text{Dc} \leq 17.1 \text{ mm}$

- Having performed the mechanical positioning correctly the electrical switching operation has to be tested and verified. In order to perform this re-attach and solder the leads to the switch S1, (recal the first work step and the Figure 3).
- Disconnect /remove connector X822 of the ribbon cable on the PCB D802, see Figure 6.

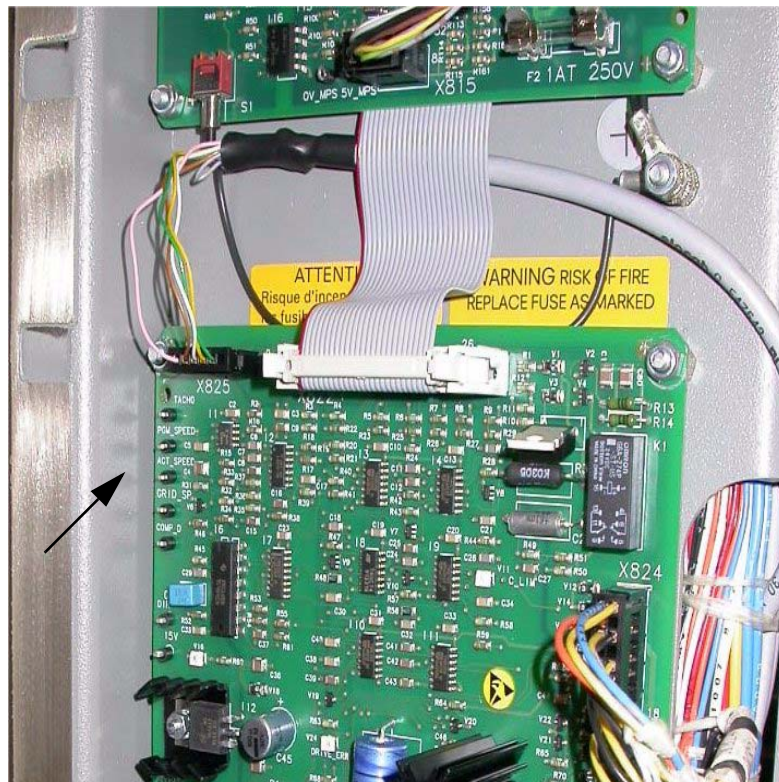


Fig. 6

**CAUTION**

**During next work steps the system will be under electrical power. Danger of electrocution. Observe all pertaining safety rules and regulations!**

- Switch the system ON, the error message ERR824 will be displayed.
- Connect the measuring points "GRID\_SP" and "0V" on the upper left side of the D802 by a clip-on measuring line, the grid drive will run continuously with maximal angular velocity of that system. (The velocities on different systems may slightly vary). See arrow on Figure 6.
- Measure first the duty cycle between the middle contact of the S1 (the toggle) and the "PE" (the other/ neighboring contact lug) by oscilloscope. The results measured for "LOW" should fall between 12 to 15%.



Compare with Figure 7 - Cycle duration:

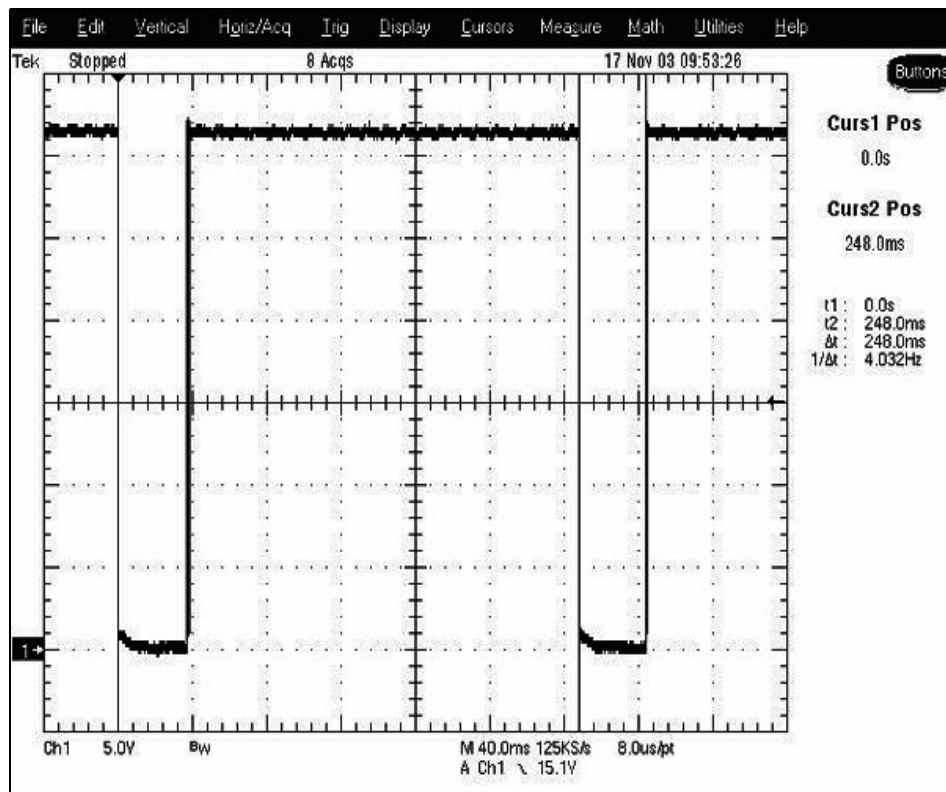


Fig. 7

The cycle duration shown here is 248 ms.

- Therefore, measured value of the time span when the signal is "LOW" should be between:

$$248 \text{ ms} \times 0.12 = 29.76 \text{ ms} \quad (\text{if rounded up} \sim 30 \text{ ms}) \text{ and}$$

$$248 \text{ ms} \times 0.15 = 37.20 \text{ ms} \quad (\text{if rounded down} \sim 37 \text{ ms})$$

Compare with Figure 8 - oscillogram for signal "LOW"

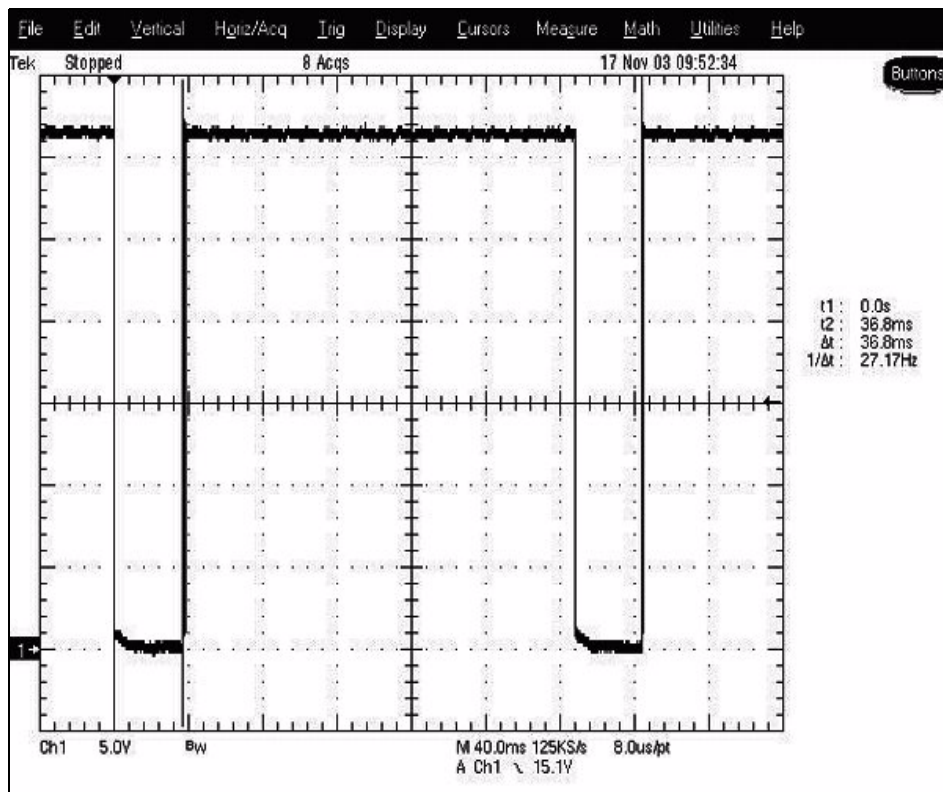


Fig. 8

- If the mechanical adjustments are correct, the signal "LOW" will usually in fact fall between limits given above. (In rare cases some corrective mechanical adjustment may be necessary).
- Switch the system OFF.

**⚠ CAUTION**

**After switching the system OFF there is still voltage present at some places. Observe the conditions stated in the Installation and Start-Up Instructions to avoid the hazard of electrocution.**

- Remove link from GRID\_SP and 0V, reconnect the X822.
- Re-assemble stand covers.
- Re-assemble the object table, you may recall the first two work steps, and refer to Figure 1. again.
- Switch the system ON, perform a few test exposures.
- Switch the system OFF, re-assemble the stand covers.
- Demonstrate the system in operation and hand it over to customer.